Strategy Research Project

INEFFICIENT BATTLE COMMAND RESULTS FROM UNIQUE COMMANDERS SOLUTIONS

BY

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ABSTRACT

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The purpose of this paper is to assess the strategic impacts of unit procured Information Technology (IT) in support of Battle Command (BC) and assess the Army major acquisition programs ability to support urgent warfighter needs. Today's selection and use of BC systems is a highly competitive process and extremely leader centric. Unit commanders and their staff, outside of the Army's acquisition process, expend unit funds to purchase or create BC systems that meet their specialize approach to BC. Training and information is not available to commanders that describe the impacts of pursuing their own BC solutions to meet individual preferences. Army acquisition programs are at a competitive disadvantage in meeting urgent warfighter needs and therefore users circumvent the system rather than use it. The result is duplicative and inconsistent unit solutions that reduce the effectiveness of BC and the efficiency of resources. Unity of effort is needed to balance warfighter innovation, manage the impact of these innovations, and the ability to incorporate successful innovations into army acquisition programs for long term sustainment.

INEFFICIENT BATTLE COMMAND RESULTS FROM UNIQUE COMMANDERS SOLUTIONS

> Our ability to leverage the power of information will be key to our success in the 21st Century.
>
> — Honorable John G. Grimes
> ASD(NII)/DoD CIO

Introduction

The DoD Net-Centricity initiatives and Army 2007 Posture Statement are based on the premise that effective use of information technology will lead to a military dominant force. The DoD Net-Centricity objective is to provide Joint commanders with a globally networked environment (interconnecting infrastructure, systems, processes, and people) within which data is shared seamlessly and in a timely manner among users, applications, and platforms enabling rapid decision superiority, resulting in full spectrum dominance. The 2007 Army Posture Statement specifies that by leveraging technologies, and the power of the Network, “soldiers and commanders will enjoy far greater ability to see and to act first – ahead of their adversaries – while dealing with the full spectrum of challenges they will face.”[1]

The change in the strategic environment resulting from the terrorist attacks in 2001 has significantly re-scoped Army modernization efforts. By 2003, with our Nation conducting operations in both Afghanistan and Iraq there was a need to provide a consistent set of BC solutions across the force to enable timely sharing of BC information. As such, the Chief of Staff of the Army provided guidance in August 2003 to build the 'Good Enough' Army Battle Command Systems (ABCS) and field it to the active force. This version was designated as ABCS 6.4.

Today, ABCS is trained and fielded to units deploying to operations in Iraq and Afghanistan. Regardless of theater its use is limited. The bulk of BC is being conducted using a variety of unit procured non standard emerging systems. Often these systems are sought after and purchased to meet a commander's perceived need that is either 1) not offered by the ABCS systems, 2) the warfighter is unaware of the capability in ABCS, or 3) he wants a specific visualization that is not offered by ABCS. The impact of this non standardization is an inability of units to synchronize an approach to Doctrine, Organizations, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) across the area of operations.

The intent of this SRP to provide a background on ABCS and the effects of unit employment of non standard solutions in use in Iraq from 2005 to the present day; to provide an analysis of what drives units to procure their own systems; and the resulting strategic impacts of the unique solutions across DOTMLPF. It will also take a critical look at the Army acquisition process and its constraints on programs of record resulting in the systems inability to be competitive in the development of BC. It will then describe several initiatives that have focused on resolving issues associated with the proliferation of software in the CENTCOM AOR. Finally it will offer specific recommendations that would balance BC standardization with commander's specific preferences with the goal of achieving the Net-Centric and Army Posture Statement premise of military dominance.

Background

FM 3.0 defines BC as "the exercise of command in operations against a hostile, thinking enemy."[2] Leadership and decision making are central to the Battle Command

concept. Effective battle command demands superior decisions—more timely and more effective - than those of the enemy.[3] In exercising Battle Command, "the commander combines the art and science of warfare in thinking and action: the science deals with facts and processes based on principles derived from the physical world—this is where the network is most useful; the art emphasizes using intuitive faculties that are acquired from education, training, experience and personal observation."[4]

In 1995, the Army published its first Army Digitization Master Plan (ADMP) that introduced the concept of “Digitizing the Battlefield” through the use of information technology to provide the warfighters a horizontally and vertically integrated digital information network that supports warfighting systems and assures C2 decision-cycle superiority.[5] Program Executive Officer Command, Control, and Communications Tactical (PEO C3T), began working with the Training and Doctrine Command (TRADOC) to develop the science of BC through the development of the ABCS. Early on these efforts were focused on developing the First Digital Division (4th Infantry Division at Fort Hood, TX) and conducting a series of experiments.

Experimentation continued for many years. As of 2001, the Army Modernization Plan described the strategic environment of, “… the United States could enjoy a period of relative strategic calm in which no single foreign power could threaten our vital interests with conventional military forces.”[6] Although the plan did describe threats to include “terrorist networks” the environment did not ignite an urgent need to meet the digitization goals across the force. With technology becoming more prevalent, units outside the experimentation process began to seek their own BC solutions. The units that were provided Army program of record (POR) solutions became known as the

"Have's" while the rest of the Army was the "Have Not's". The limited scope of the Army digitization efforts lead to a commercial market place for BC solutions, and established the mode of operation for units to expend their own funds to procure them.[7]

With the terrorist attacks on September 11, 2001, the Strategic environment significantly changed and deploying units struggled to pull together the partially fielded ABCS systems. These units purchased information technology solutions to meet their BC requirements. In August 2002, the 82d Airborne Division deployed to Afghanistan and stood up Coalition Task Force – 82 (CTF82). At this time, CTF82 was only partially fielded with ABCS and selected to use Maneuver Control System-Light (MCS-L) to support the execution of BC. MCS-L at this time was an ABCS system under development, but was authorized for limited use under the 'beta' program. MCS-L interoperability was limited and units in the Joint Operational Area (JOA) did not have position location systems, so most data viewed on MCS-L was manually entered.[8] Although MCS-L provided CTF82 with shared visualization that supported execution of current operations, their intelligence staff was unable to provide timely answers to priority information requirements (PIR). Further analysis of the situation identified the cause: data was being collected using multiple intelligence software packages across numerous systems resulting in islands of data sources without sufficient tools to integrate them. As a result, the unit initiated efforts using Web technology and a central database to build the capability they needed. Eventually this capability would be known as FusionNet.[9]

In early 2002, in preparing for Operation Iraqi Freedom (OIF) the Force XXI battle command-brigade and below (FBCB2) system was augmented with satellite

communications and installed on key vehicles of the 3rd Infantry Division (ID), 82d Airborne Division, the Marine Expeditionary Force (MEF) and in British tank forces. The capability became known as Blue Force Tracking (BFT).[10] BFT was successful at providing friendly unit situational awareness, becoming a critical enabler for commanders that used this information to 'decide rapidly where, when, and how they would employ'[11] the ground forces engaged in the conflict.

BFT provides only a small part of BC, and although it was a great success, the rest of BC (across forces engaged in the first phase of OIF) was composed of a partial fielding of ABCS, to include the MCS-L (again still in Beta) at Army Divisions, and Command and Control Personal Computer (C2PC) at Corps and the MEF. OIF assessments identified some success with individual ABCS systems, but identified significant shortfalls in ABCS, in that the systems failed to interoperate in the manner expected, and did not adequately provide the commander relevant information. [12]

> In 2003, the Chief of Staff of the Army (CSA) directed that the Army shift its funding efforts from developing the BC architecture from the bottom-up to one that was focused on developing the architecture from the top-down. Additionally, he directed fielding the capability to the entire Army. Prior to this decision, the entire Army Battle Command suite was only programmed for a fraction of the Army force. This decision redirected resources, stopped development of the ABCS software suite at the current Block IV, and redirected all available funding to fielding a C2 system to the entire force structure.[13]

Based on the CSA direction, PEO C3T's top priority was to expedite the delivery of ABCS 6.4 software. The CSA wanted a "Good Enough" system that focused on the commander's operational needs, plus Joint and Coalition Interoperability to be delivered across the force. Today, ABCS 6.4 meets the Army's "good enough" prioritized requirements and provides net-centric data management to support interoperability between its systems. However, ABCS 6.4 will need further development to interoperate

with joint and coalition forces. Currently, units deploying in support of Operation Enduring Freedom (OEF) and OIF are equipped and trained on ABCS 6.4.[14]

Today, in OIF, ABCS capabilities are used, “but the integrating aspects of ABCS have been marginalized.” [15] This is due to the nature of the operations being less focused on conventional combat operational tasks of “fire and maneuver” and “move, shoot and communicate” [16] that ABCS was designed for. Instead the focus is on collaboration, non-standard interactions (CID, WIT, CA, PSYOPS, etc.), combined operations with Iraqi & multi-national forces and specific information management processes. As a result, units use a combination of Microsoft Office products, portals, and emerging systems (CIDNE, FusionNet, TIGR, TACTICOMP, Effects Based tools, etc.) to meet the majority of their BC requirements. [17]

Discussion

Over the last several years deployed units have used the operational needs statement (ONS) process to obtain supplemental dollars in order to build emerging systems. With predictions that the supplemental budget is soon to dry up we need to address the need for these systems. The discussion will focus on answers to the follow three questions: (1) Why do commanders build their own systems? (2) Why don’t the Program of Record systems provide the units what they need? (3) What has been done to mitigate the situation and how effective was it? When addressing these questions, I’ll use significant event (SIGACT) tracking systems as a case study.

Why Do Commanders Build Their Own Systems?

Software is different from other capabilities provided to warfighters. Warfighters don't discard their vehicles, uniforms, or weapons and just go build or purchase another.

But this is exactly what they do with Battle Command software. If they need something, they build or procure it and load it on their computers without considering potential impacts. I propose there are several reasons for this.

First historically, the "have not" units', as discussed in the background, only alternative was to procure their own BC systems. A strategic impact of the Department of Army's decision to limit fielding to experimental divisions for over a decade was that it established the mode of operation for units to believe they needed to fend for themselves. Next, software is cheap and easy to build, and changing software is standard operation for anyone with a PC. If you need something, search the internet, download free trials, pick the best and then purchase and install. Another reason comes from the 'Art' of BC. Commanders want to visualize data in the way that makes sense to them. Often POR applications cannot be tailored to meet individual visualization preferences. As the owner of the system, you can continue to change software to meet new requirements, and therefore more rapidly meet the commander and his staff emerging change requests. For SIGACT tracking systems, units have conducted a Relief in Place/Transfer of Authority (RIP/TOA) and impacted the transition of the SIGACT tracking system by replacing it with their own. This is what I consider the "Not invented here" reason. All these stem from there being a need that is not being met!

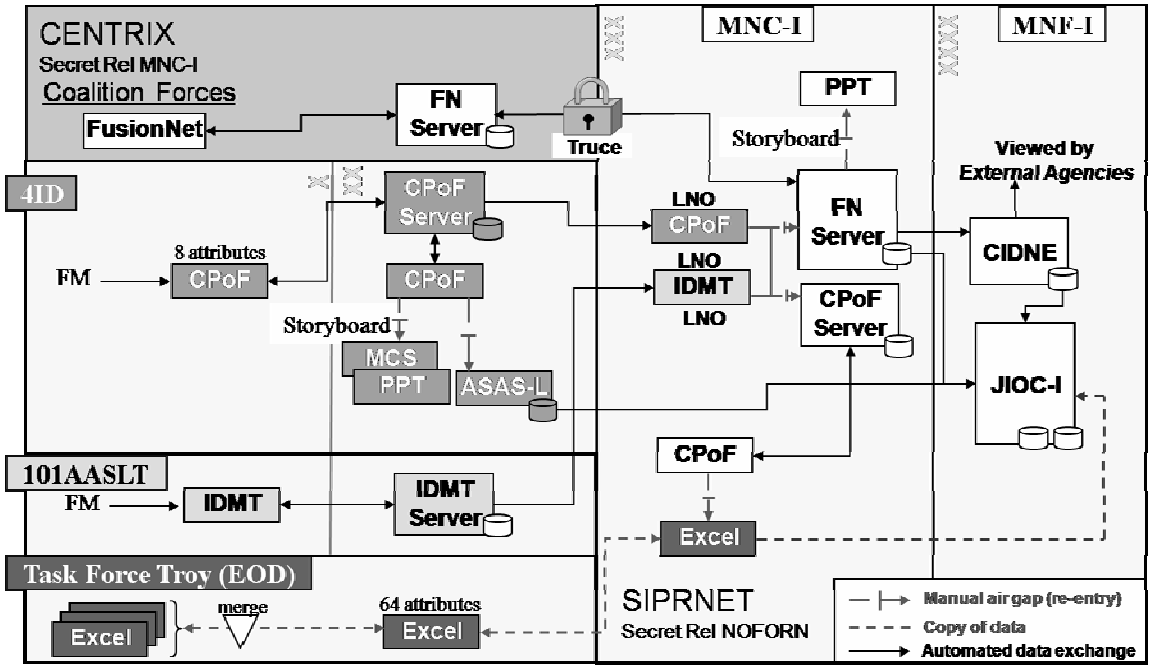

Figure 1 - OIF Event Reporting - May2006

Using the SIGACT Case Study, figure 1 shows the various systems that were individually built by units to manage events. The various systems utilized tracked different attributes for events, and manual re-entry was used to translate and move data between systems. PowerPoint storyboards were used to describe the event through the use of pictures, maps and words. PowerPoint provided an unconstrained and effective way to quickly share knowledge about the event. The figure portrays various systems that took part in collecting the event data during the tactical response. Not shown in the figure is the impact of this event data on operational and strategic processes. For example, as documented by the Joint Improvised Explosive Device Defeat Organization (JIEDDO), an IED event reported at the tactical level is essential to support operational and strategic processes such as: Forensic analysis, IED defeat mechanisms, Device fabrication, trends and patterns by geographic area, RF signatures and force protection requirements and bomb maker and his affiliated network. [18]

The most significant outcome of units procuring their own equipment is that it impacts the effectiveness of BC and the efficiency of resources. In particular, there are inefficient costs associated with duplication or overlapping capabilities. The secondary effects include the inability to standardize across the force, inhibiting the development of standardize doctrine, training and SOPs, and duplicative efforts for security accreditation, testing, maintenance, interoperability, logistics and sustainment for these products.

The impact of these systems on our ability to meet the net-centric knowledge sharing goals will be analyzed in order to examine the impacts of unit procured solutions to the effectiveness of BC. The Net-Centric Operational Environment Joint Integrating Concept (NCOE JIC) specifies that data is the facts, information is data in context, and knowledge is the intrinsic value of the information. [19] It further defines knowledge sharing as:

> The ability of networked users to manage and make available relevant, accurate information, transform it into knowledge, and act upon it with confidence. This provides access to newly discovered or recurring information in a useable format and facilitates collaboration, distributed decision-making, adaptive organizations, and a greater unity of effort via synchronization and integration of force elements to the lowest levels.[20]

These individual unit solutions inhibit sharing of data, information and knowledge. As a result there is less effective unity of effort in the integration of force elements to the lowest levels. One approach that is often used to overcome this shortfall is to keep various systems in place, but create data strategy that enables interoperability between these systems. Interoperability provides a means of sharing the facts, but does not enable the context or the intrinsic value of the fact to be shared. The November 2007 the PEO C3T BC observations from Iraq identified that “Interoperability does not

achieve collaboration; data is removed from its context and is subject to various interpretations"[21]. Additionally, their observations indicate that the current BC emphasis to support operations in Iraq is collaboration. Thus, a unit commander's unique solution, even when interoperability may appear to support his unit's effectiveness, may actually reduce overall effectiveness across the operation.

The use of PowerPoint to develop storyboards is a way that a unit may collaborate on a given event. The result is 'unit acquired knowledge' without the ability to extract data so that it can be used by automated processes to analyze the event. This is knowledge without usable data, thus limiting its usefulness outside the unit.

Going back to our example, since the IED reported event data collected at the tactical level is critical to a wide variety of processes it is imperative that the data be consistent, complete and accessible. Unique unit solutions at the tactical level lessen the effectiveness of the rest of the process.

Why Don't The Program Of Record (POR) Systems Provide The Units What They Need?

Among the Army's biggest challenges today are acquisition activities. The combination of the need for the Army to be prepared for are more ambiguous and diverse threat, the fast pace of technology, the changing environment outpacing the developing concepts and doctrine, the high pace of operations and need to continuously evolve software in support, the transformation of the Army and the larger DoD initiatives to move to a Joint Net-Centric warfighting force all contribute to the challenge. [22] Given these competing interests, the Army instituted Software Blocking (SWB) in 2001, with the "overall goal from a System of Systems viewpoint to field a group of proven mutually interoperable systems which best support the Army Warfighter, IAW TRADOC-

established priorities." [23] POR system offices are currently challenged in providing timely solutions to urgent requests that come from OIF/OEF. The software blocking process is designed to be flexible enough to accommodate the warfighter's urgent needs, while assessing operational impact, value added, training impact and risk. The processes ensure adequate testing in order to evaluate the capability and reduce risk.

While ABCS systems focus on implementing the Good Enough solution, they adhere to the SWB process. ABCS 6.4 "Good Enough" was built based on requirements primarily resulting from unit experience during the conventional combat operations phase of the second gulf war in 2003. These requirements, known as the 7+1, prioritized implementation of interoperability in order to provide the common operational picture (COP) essential to having shared situational awareness, and the capability to exchange necessary information across echelons and functional areas during operations. [24] With a COP, ABCS could then "automate combat business processes during the prosecution of well known and rehearsed staff battle drills."[25] ABCS utilized current technology innovations during development, and then stagnated for a year and a half while system of system testing was being conducted.

During ABCS 6.4, testing conducted on warfighter requirements transitioned from the conventional combat operations based on 7+1 to irregular warfare requirements. "This coincided with a significant increase in relevant technology maturity predominantly in the web services area as well as network availability to the warfighter. The increase in requirements, as well as technology innovations enabled the unit (and others) to create responsive technology."[26] When ABCS 6.4 was approved for release operators found it

well suited for supporting short and decisive conventional combat operations, but far less capable of supporting the current irregular warfare mission.

In order to get back on track, ABCS shifted its priority from periodic major updates to short-term and low risk iterative updates based on user urgent needs. The Army uses the Operational Needs Statement (ONS) processes to "identify urgent operational needs that jeopardize soldiers' lives or mission accomplishment."[27] Using this process ABCS systems have shortfalls identified and updates approved for implementation. However, prior to fielding updates based on ONS, ABCS is required to go through the SWB process. Within the last year, the SWB process was updated to attempt to incorporate a quarterly schedule for approvals and submission of patches in order to be responsive to urgent warfighter needs. To date, the approval part of the process significantly lags the implementation and testing, resulting in units finding alternative methods to get the capability they need. [28]

CJCS Guidance for 2007-2008 (1 OCT 07) charges us all to "improve requirements, acquisition, and technology development efforts to ensure rapid, predictable delivery of needed combat capabilities to our warfighters." [29] LTC Mike Gibler's (former SBCT BN commander) perspective on the current process is that it is an "arduous acquisition process – the enemy in the future fight…needs to meet requirements of the warfighter instead of the system"[30].

The SWB process, given a combination of tiered risk decision authority and the quarterly certification for release, should ensure rapid, predictable delivery of warfighter capabilities. It is "personalities, relationships and priorities"[31] that are slowing it down. Often patches are held up in 'bureaucratic exercising of oversight that is bogged down

in a protracted coordination process that gives excessive attention to detail'[32] and the elimination of risk. What is needed is a 'shared commitment – often the most obvious determinant of success' [33] – to meet the warfighter need as quickly as possible. Additionally, flexibility and innovative approaches are needed to validate software so (in accordance with its risk level and urgency) it can be fielded to fulfill the pending need. [34]

"Change propagates faster today than any other period."[35] As a result, PORs need a fair playing field in order to effectively meet warfighter demands. The SWB process enforces different rules for PORs and non-POR systems; it requires validation in a test facility that does not control many of the interfaces, and ultimately results in less control of system usage as warfighters circumvent the process rather than use it.[36]

AR 70-1 states that "All milestone decision authorities (MDAs) will provide a software blocking assessment that will be submitted for validation…."[37] It does not identify a process for systems without MDA (or non-Program of Record systems). As a result, non-POR programs are given a competitive advantage in that they can implement and deploy software changes at the unit's discretion. The unit takes the risk of the software change not working, the training implication, the impacting of interoperability or causing other havoc. Most units are willing to accept this risk because it can be controlled by limiting the scope of the patch, or simply reloading the old version if the new version fails. The alternative of working with a POR and submitting an ONS, and then working the through the SWB process is lengthy and time consuming.[38]
The whole concept of requiring a program to go to a test facility to certify software prior to its release needs to be re-assessed. Today's environment is a good example; updates to PORs depend on interfaces with programs that the Army does not own. The

impact is that by the time the test facility gets what it needs to certify a system the non POR interface has changed, thus invalidating the test.[39] In the Net-Centric future we cannot expect to test systems in a controlled environment.

As a result of ABCS inability to meet user demands, users are going around the POR process to get what they desire. The lack of POR solution impacts both the effectiveness of BC and the efficiency of resources discussed in the previous section.

What Has Been Done To Mitigate The Situation, And How Effective Was It?

The Department of Army and CENTCOM have had several efforts focused on controlling the incorporation of unit procured solutions in the CENTCOM AOR. The goal of these efforts as outlined by CENTCOM's "Introduction of New IT Into the CENTCOM AOR" policy is intended to:

> (a) Improve theater joint interoperability by ensuring all new capabilities service the broader joint mission vice unit or organization-centric requirements; (b) Stem the introduction of duplicative or overlapping capabilities competing to satisfy common requirements while consuming network capacity; (c) Enhance information assurance by addressing security certification prior to fielding; (d) Incorporate a NETOPS management construct for the system prior to IOC; (e) and ensure its capabilities have an out-year sustainment strategy. [40]

In order to discuss this fully, a summary of the Army Best of Breed, PEO C3T Battle Command Common Services (BCCS) and Information Management Framework (IMF), transition of science and technology initiatives into program of records, and the CENTCOM Introduction of New IT Into the CENTCOM AOR follow.

Army Best of Breed

HQDA initiated a Best of Breed (BoB) process in October 2005 in order to reduce the number of commercial and government developed products being used in the tactical environment. "The Army's goal was to mitigate the proliferation of unit

purchased and non-standard Knowledge Management (KM)/collaboration tools and applications across the Army. During this four month effort the G-3/5/7 and the CIO/G-6 worked with Corps and TRADOC schools to identify and assess currently deployed tools to support standardization on a single KM/Collaboration solution set." [41] The result was a reduction in the systems from 25 tools to 6 that represented the "Best of Breed" technologies across three KM categories.

This process was effective in that it engaged HQDA, FORSCOM, and the PEOs in collecting and assessing capabilities and tools that are being procured in theater. The selection of multiple tools in the three areas, however, limited the effect of having a common, interoperable and integrated solution as a result of this process. For example, the two tools selected for the Data Fusion (SIGACT) category were FusionNet and CIDNE. Each tool was developed at MNC-I by rotating CORPS. The result of selecting both is that as a CORPS rotates they can change the established Data Fusion tool. This change impacts all subordinate unit processes, and requires data to be translated and imported into the incoming tools database.

With respect to this decision, CENTCOM J3 Command and Control Division conducted a Joint Information Management Board (JIMB) in February 2007 to develop a plan to migrate to a single authoritative SIGACT reporting / analysis tool. The result of this conference was the immediate selection of CIDNE for Iraq, and the migration to CIDNE in Afghanistan linked to the next unit JTF rotation. Additionally, CENTCOM J3 documented architectural and information exchange requirements, database roles, responsibilities, authorities, oversight and training requirements for the centralized, authoritative theater SIGACTs / IED reporting database. Furthermore, CENTCOM J3

began discussions on a transition plan to migrate the capability to a POR for sustainment. [42]

Battle Command Common Services / Information Management Framework

In order to more effectively support the warfighter in OIF/OEF, PEO C3T has established an approach that would balance a unit's ability to innovate solutions that could be shared with others as well as be incorporated into ABCS for long term resourcing. These efforts include Battle Command Common Services (BCCS), which provide a common hardware and software solution to Divisions and BCTs in order to enforce a common implementation of Microsoft Enterprise services such as email, portal, web and security practices, and to provide ABCS interoperability services. Additionally, PEO C3T established the Information Management Framework (IMF) shown in figure 2. This framework enables a common approach for the development of unit solutions so they can be shared, supported and sustained in a common way. Additionally, associated processes have been established to enable warfighters to submit their software solutions for validation, certification and incorporation into the library of capabilities made available across the force. The IMF is made up of three tiers: the first tier is the infrastructure that is provided by BCCS, the next tier is the automated processes (Web Applications) that are built by ABCS and users. The final tier is the end user system (Unit Site). PEO C3T recognized that most processes (middle tier) are common among units but their employment is often tailored to meet unit specific concept of operation (CONOPS). The tiered approach enables the middle tier processes to be shared and then customized by the unit when added to the unit site so that it supports their specific CONOPS and visualization preference. The initial IMF

concept was developed in FY2005 and since has been implemented by PEO C3T. Recently the IMF concept has been incorporated into an overall DA CIO/G6 strategy in support of the DoD Net Centric initiatives.

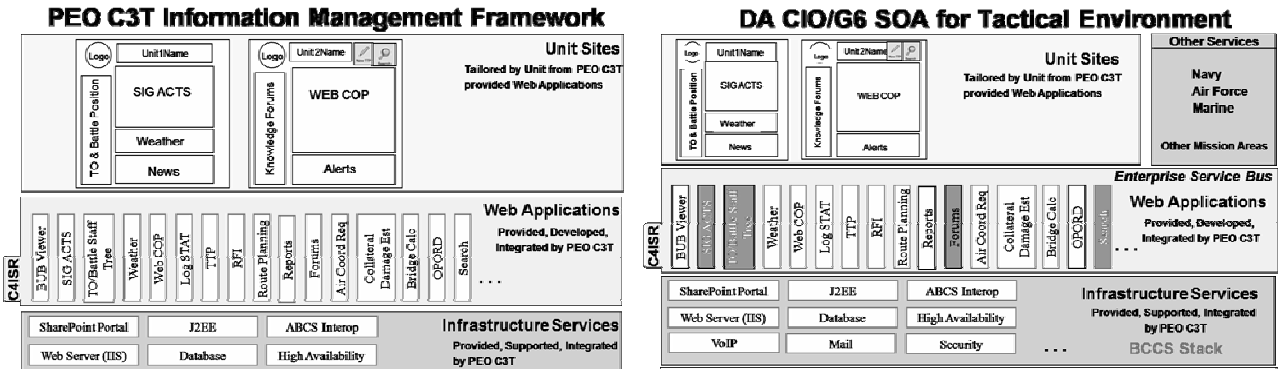

Figure 2: PEO C3T IMF and DA CIO/G6 Net Centric Initiative

Transition of Science and Technology Initiatives into Programs of Record

Several science and technology (S&T) programs have been successfully worked directly into combatant command capabilities using an agile approach to rapidly build an interim capability to meet the emergent warfighter needs. Once military utility was successfully demonstrated these programs were transitioned to PORs for sustainment, validation and fielding. Examples of such programs include DARPA's CPoF and the JCTD NOMADD [43]that have transitioned to ABCS. Using this approach, the S&T community worked closely with CENTCOM, including forward support on the battlefield, in order to exploit future advances in technology and iterate and mature the interim capabilities. This process is advantageous, in that it allows the maturing and evaluation of the utility of an emerging tool prior to committing it to acquisition.

Often the S&T community provides potential solutions that were not design for transition to a POR. Then once the military utility is successfully identified transition may be unfeasible due to differences in user experiences, data structures, programming

languages, software design or required infrastructure. As a result these solutions add to the proliferation of systems, and sustaining them becomes costly to an acquisition program. Thus, it is imperative that up front transition is planned and proper oversight is established in order to ensure successful transition.

CENTCOM Policy

In June 2007, CENTCOM established the "*Introduction of New IT into the CENTCOM AOR*" policy. This policy established procedures for "approval over the introduction of any new or enhancements or expansions to existing IT capabilities in the USCENTCOM AOR. This includes networks, systems, applications, ACTDS, JCTDS, pilots, beta tests and prototypes that rely on the theater's joint network to conduct data exchanges." [44] The effectiveness of this policy is personality dependent since tools are not available in the CENTCOM AOR to monitor changes and manage software on the network. Military Services are responsible for organizing, training, and equipping units. Since this policy gives CENTCOM the authority to specify what equipment can/can't be used in his AOR, IT efforts planned for CENTCOM require continuous coordination in order to be successful.

Effectiveness of Efforts

All efforts described in this section are supportive in controlling of the proliferation of BC systems in CENTCOM. However, they can be circumvented; therefore the effectiveness is dependent on commander's support and incorporation of these controls across DOTMLPF. These efforts need a robust lessons learned process so that lessons are incorporated into a coherent, focused, long-term approach to BC modernization efforts resulting in the competitive advantage needed for irregular warfare. Clear

understanding of the purpose of these efforts and their impact to the effectiveness and efficiency of BC needs to be communicated to commanders to affect their success.

Recommendations

Unity of Effort – It's a Team Sport

The current threat changes our environment from a "time of reasonable predictability – to an era of surprise and uncertainty."[45] Program Managers are challenged to effectively support the warfighter in this environment. They need agile and adaptive enterprise approaches that are supported by systems, personalities and relationships focused on common priorities in order to facilitate timely solutions to emerging warfighter needs. In doing so, there needs to be a balancing of the risk associated with delivering a solution with the benefit to the warfighter engaged in conflict. The COCOM and warfighter need to be critical players in the decision cycle, and they must be able to trust the acquisition process so they do not have to find alternative ways to meet their needs. Alignment of S&T and PORs should be established to allow for refinement and evaluation of an emerging warfighter need before committing to acquisition. Management and oversight of the S&T efforts and POR could ensure effective and efficient transition of successfully demonstrated capabilities, reduce risk and cost to a POR, and enable continuous development of solutions to meet emerging needs. The solution is one of balance. A certain amount of independence is healthy and desirable in order to promote innovation. The implementation process needs to allow units and the S&T community the ability to innovate and methods to assess the solutions for incorporation into a program of record in order to provide long term re-sourcing.

Net-Centricity Leads to Less Control

As systems become more networked the less control there will be of the environment that they will operate. Army BC systems are employed in joint, interagency, and multinational environments. As such information technology policies, guidance and directives need to be coordinated with Joint services and with combatant commanders in order to provide fully integrated and interoperable networked joint information technology solutions. Our software release process and associated testing needs to be tailored to take into account the uncertainty of the environment in which BC systems will be employed. As such, software today (and ever increasingly as we achieve net-centricity) needs the opportunity to be validated without the requirement to bring every interface to a test facility for approval. New risk mitigation approaches and test strategies need to be developed to prepare for this future.

Train Capabilities and Big Picture

The "future cannot be won by focusing on technology; they will be won by preparing our people…"[46]

The rate of technology change is predicted to continue to escalate. Since we cannot control this we need to ensure our processes can account for its continuous change. Training should be focused on applied capabilities verses specific systems. Additionally commanders require an understanding of the larger picture that a given capability supports and how, given the highly networked environment, a single unit solution can have negative effects on operational and strategic level processes.

Incorporate Irregular Warfare Methods across DOTMLPF

Our enemy today is agile and adaptive and he uses technology to his advantage. Future assessments describe an emerging national security era dominated by irregular warfare.[47] As such, the Army modernization efforts need greater attention on incorporating technology innovations developed in theater into a coherent, focused, and long-term approach to BC. In exercising BC, the commander combines the art and science of warfare. As such, it is not enough to incorporate only the technology developed by warfighter, but we also need to capture and integrate them across the rest of the DOTMLPF domains.

Conclusion

Ms. Helen Greiner, iRobot Co-founder and Chairman, stated that your 'success is measured by having long term, satisfied partners that trust you.'[48] Given the proliferation of unit procured information technology solutions - our acquisition programs have failed to meet this measure of success. This proliferation has significant implications on our ability to achieve the net-centric objective of providing Joint commanders with a globally networked environment within which data is shared seamlessly and in a timely manner among users, applications, and platforms, enabling rapid decision superiority resulting in full spectrum dominance. [49] The current DA approach is not advantageous in enabling program of record BC systems to be agile and timely enough to meet pending operational needs. The result is that units go around the system, procuring their own BC capabilities, reducing the overall effectiveness and efficiency of the mission. On-going irregular warfare efforts in Iraq and Afghanistan provide the Army an opportunity to work with the Joint community and COCOMs using agile and adaptive enterprise processes

that are supported by personalities and relationships focused on common priorities in order to facilitate timely solutions to emerging warfighter needs. Taking take advantage of this necessitates change! Our environment is uncertain and our enemy is adaptive, therefore to defeat him we must be as well.

Endnotes

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